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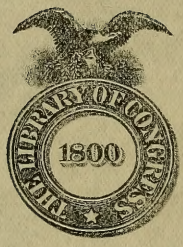

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UNITED STATES DEPARTMENT OF AGRICULTURE
BULLETIN No. 1095

Washington, D. C. October 12, 1922

PRODUCERS' COOPERATIVE MILK-DISTRIBUTING PLANTS

By O. B. JESNESS, Specialist in Cooperative Organization, W. H. BARBER, Assistant in Marketing Dairy Products, and A. V. SWARTHOUT, Investigator in Market Business Practice, Bureau of Agricultural Economics, and C. E. CLEMENT, Market Milk Specialist, Dairy Division, Bureau of Animal Industry

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PRODUCERS' COOPERATIVE MILK-DISTRIBUTING PLANTS.

By O. B. JESNESS,[1] *Specialist in Cooperative Organization*, W. H. BARBER,[1] *Assistant in Marketing Dairy Products*, and A. V. SWARTHOUT, *Investigator in Market Business Practice, Bureau of Agricultural Economics*, and C. E. CLEMENT, *Market Milk Specialist, Dairy Division, Bureau of Animal Industry.*

Milk producers supplying a number of cities have undertaken to solve some of their milk-marketing problems by the establishment of cooperative milk-distributing plants. The objects sought and the conditions which prompted the producers in their actions have been varied. In some instances a number of producers, each delivering direct to consumers, have sought to eliminate the duplication resulting from their individual route-delivery services and to reduce the cost of distribution by establishing a cooperative plant with a centralized delivery system. Difficulty in procuring necessary farm labor has been a factor in some instances in encouraging the establishment of a central plant, since it enabled the producers to devote more time to production.

Ordinances requiring tuberculin testing of all cows or the pasteurization of all milk under strict sanitary regulations of the health department have in some cases made it desirable for producers to establish a cooperative milk-pasteurization plant in order to comply with the city ordinances. In some instances producers have purchased privately owned plants with a view to effecting greater efficiency and economy in handling and distributing their milk supplies. Low prices and alleged unfair treatment from private concerns sometimes have aroused action which has resulted in the establishment of cooperative plants.

Cooperative milk-distributing plants at present are located mostly in small cities where a satisfactory system of distribution had not previously been developed. Milk producers supplying the larger cities usually have organized cooperative associations for the purpose of acting as agents for their members in making contracts for the

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sale of milk to city dealers. To distribute cooperatively a considerable proportion of the milk supply of a large city would require an organization with a large capital. The problem of operating large milk-distributing plants is more complex in large cities than in small cities where the producers are located in the immediate vicinity of the city in which the plant is established.

ESTABLISHING A COOPERATIVE MILK PLANT.

The advisability of establishing a cooperative milk-distributing plant can not be determined without first having obtained complete information as to local conditions. To obtain this information a careful survey of the local situation should be made. This survey should include such important factors as the present marketing methods and conditions, existing marketing facilities, the direct benefits of a cooperative plant to producers, the attitude of the producers, the support likely to be given the enterprise, the volume of business available, means of financing the venture, and such other information as will be helpful in determining the possibilities of success in operating a cooperative plant.

An actual need for a cooperative milk-distributing plant should exist among the producers. A desire and demand for a cooperative plant should be manifested by the producers themselves. Unless the sentiment of the producers is strongly in favor of a cooperative plant, and they feel that a plant is an absolute necessity for the solution of their problems, adequate financial support and sufficient volume of business for successful operation may not be obtained later when needed. Active leadership of a sane and sound character must exist somewhere among the producers, for it will be required in the administration of the business later by the board of directors.

ESSENTIALS FOR SUCCESS.

A first essential for success in a cooperative plant is sufficient volume of business to make economical operation possible. The actual supply of milk pledged for delivery to the cooperative plant must be given careful consideration. If only a small part of the milk produced in the locality is pledged, it may be impossible to operate the plant efficiently and economically. Specific figures can not well be given, but it has usually been found that unless at least two-thirds of the milk marketed locally is pledged to the organization, it is advisable to defer the establishment of a cooperative plant until the necessary support has been obtained.

Efficient management is essential in any business. Especially is this true in cooperative milk plants, because many technical and practical problems must be handled properly to obtain best results. Efficient business methods are essential to good management and an ade-

quate accounting system is indispensable in keeping a check on the business.

A conviction on the part of the members that cooperation, or a working together, will benefit each individually is essential for the success of the organization. The members should understand that as members of a cooperative organization they must give it their moral, financial, and material support, for its success depends directly upon them. Every member should regard the cooperative milk plant as a business enterprise whose success will contribute to his success. Its cooperative features give it no supernatural power that will keep it from failure when it is mismanaged or not properly supported by its members.

Before launching into the operation of a cooperative milk plant, adequate capital for financing it should be assured. Unless the plan of financing will permit the purchase of necessary machinery, equipment, supplies, etc., when the plant is started, provide adequate working capital, and enable additional equipment to be purchased, when needed, during the operation of the plant, sooner or later financial difficulties will be encountered. Complete estimates of the total capital investment should be obtained from reliable sources, and the plan of financing adopted should adequately provide for the raising or securing of the necessary capital funds. Large loans, bonded indebtedness, or other liens against the organization should be avoided. No financial handicap should be placed upon the organization, for the problems to be met may be difficult enough without introducing unnecessary financial ones. In fact, the organization should be started under most favorable conditions and the problems of financing should be solved before the organization enters into the business of milk distribution.

A fifth essential to the success of a milk-distributing plant, is the maintenance of high standards in the quality of the product handled and sold. The raw material received must be carefully produced under sanitary conditions, must be handled by modern up-to-date methods, and sanitary conditions must prevail in the plant. Without high quality in the product, customers are likely to become dissatisfied and the business fail because of lack of patronage.

Another essential is a sound business policy in conducting the business of the organization. Such a policy must be adopted by the board of directors, for without it the manager can not know that his action will meet with the approval of the board. An organization with a board of directors that has adopted a sound business policy may succeed with a mediocre manager, where otherwise it might fail. Likewise an organization with a most competent manager but having a board of directors which will not support a sound

business policy may be doomed to failure. It is obvious that the board should be composed of men with an understanding of sound business principles.

MARKETING CONTRACTS.

In cooperative milk-marketing organizations it has been found desirable for the business relations between the producers and the organization to be clearly defined in a marketing contract. By the terms of such contracts the producers agree to deliver to the organization all the milk produced on their farms, except that required for farm or household use. The organization in turn agrees to sell and distribute the producers' product and to make returns therefor in accordance with specific provisions of the contract. Such contracts tend to give greater stability and permanence to the organization.

METHODS OF FINANCING.

Rather large investment in buildings and equipment are required in cooperative milk plants for the proper handling of milk and milk products. Definite methods of financing must be worked out carefully and adapted to the form of organization to be employed. Cooperative milk-marketing organizations may be financed either with or without capital stock. In nonstock organizations the necessary capital may be obtained from membership fees, cash payments for certificates of indebtedness, or from loans made by the members, while in organizations with capital stock the necessary capital is secured by selling shares of stock. Cooperative milk-plant organizations usually have been formed with capital stock, as producers are more familiar with this method. An equitable plan adopted by some organizations requires each producer to purchase shares of capital stock in proportion to the number of cows milked or the amount of dairy products to be marketed at the plant.

In some organizations both common and preferred stock have been issued. Preferred stock ordinarily is entitled to dividends before any are paid on the common stock. The dividends on preferred stock usually are cumulative, and it is customary to withhold voting privileges from stock of this class. The plan of using both preferred and common stock may be advantageous in some organizations, especially where it is necessary to sell stock to others than the members and the producers wish to retain control of the organization through ownership of common stock. However, it should be borne in mind that all the preferred as well as the common stock of associations that desire to come within the scope of the Capper-Volstead Act must be held by producers.

A number of nonstock organizations have been financed through the sale of certificates of indebtedness. These certificates are sold for cash the same as capital stock. The rate of interest is fixed and date of maturity stated on the certificate. They may be sold to any one, since voting power is limited to members only. Usually the certificates of indebtedness are issued in series which mature in from 1 to 5 or 10 years with amortization coupons attached which mature annually. These certificates are paid with sums deducted monthly from patrons' checks and for which the patrons are issued new certificates annually. The interest on the certificates is considered an operation expense and is paid from the reserve fund established for this purpose.

FORMING THE ORGANIZATION.

If the establishment of a cooperative milk plant appears advisable after a very thorough survey has been made of the local situation, the actual work of forming the organization can be taken up actively. Preliminary meetings of the prospective members should be held and the proposed plans of the organization thoroughly discussed at such gatherings. If the successful establishment of a plant seems feasible, an organization committee should be chosen at a called meeting of the prospective members. This committee should proceed with the formation of the permanent organization, including the drafting of suitable by-laws, a marketing contract, and plans for financing the proposed plant.

Subcommittees of the organization committee may be selected to undertake various lines of work. Thus, there may be a subcommittee on membership and a subcommittee to obtain information on the cost of plant and equipment. The latter committee may find it beneficial to inspect the operation of plants already established. First-hand information regarding methods employed, difficulties encountered, and problems to be met in a new plant will be most useful and valuable.

After the organization committee and its subcommittees have completed their preliminary work, a meeting should be held at which the question of perfecting a permanent organization should be decided definitely. Where it is decided to establish a milk-distributing plant, the various plans submitted by the organization committee should be discussed and approved with such changes as seem advisable. Temporary directors should be elected at this meeting and authorized to proceed to incorporate the organization.

INCORPORATING THE ORGANIZATION.

The committee that works out the organization plans should obtain all information possible relating to the corporation laws of the State in which the organization is being formed, because the plan must fit

the requirements of the law under which the organization is to be incorporated. Many States have one or more special laws providing for the incorporation of cooperative associations, and it is usually advisable to incorporate under a cooperative law wherever practicable.

Laws designed for noncooperative business corporations in many cases are not best suited to cooperative organizations, as such laws generally grant each share a vote and provide for dividends on capital stock. Equal voting rights and privileges in cooperative organizations are important and should be adhered to very closely in forming such organizations.

The exact procedure to follow in incorporating an organization depends upon the provisions of the State law under which the organization is to be incorporated; consequently no general plan covering all details can be given. Legal counsel should be employed in obtaining the necessary legal information and in preparing the papers for incorporating the organization.

The temporary board of directors may serve as incorporators, or a committee may be selected for this purpose.

BY-LAWS OF THE ORGANIZATION.

If by-laws have been approved by the milk producers at the general meeting they should be adopted after the incorporation has been completed. The organization then may undertake the objects for which it was established. The by-laws of a cooperative organization should clearly define the purposes for which it is organized and specifically provide for the management, financing, and conduct of its business. Local conditions and plan of financing and operating the organization should be taken into consideration in preparing the by-laws, in order that they may provide for the needs of the organization.

A suggested form of by-laws which may serve as a guide in the preparation of by-laws suited to the needs of cooperative milk-producers' organizations is given in the Appendix. Changes necessary to adapt them to local conditions and the requirements of State law should be made.

OBTAINING A SUITABLE BUILDING.

One of the first questions to be considered by an association is whether to erect a new plant or to rent a building temporarily until such time as a new building can be erected. Sometimes, when the amount of available capital is limited, it may be well to rent a building, if a suitable one can be found, until the capital necessary for the new building can be raised. One of the important considerations, of

course, will be to ascertain if there is a suitable building available for the purpose. Not every building can be remodeled to fit the requirements of a milk plant, and in some cases the cost would be prohibitive.

The building, in the first place, must be conveniently located. It must be so located that it will be easily adapted to the convenient receiving of the members' milk and the loading and unloading of the delivery wagons. Entrance from at least two sides of the building is desirable. Location in respect to sanitation must also be considered. Good air, good light, and good general surroundings are essential. The floors of the plant should be of concrete, and if the building does not have concrete floors, it should be so constructed that the floors can be concreted. It is important that the foundation be strong. The building must be capable of being so remodeled that a convenient plant arrangement for the conduct of the work can be secured. There are many factors to be considered in selecting a suitable building in which to locate a milk plant and it is usually advisable to obtain the assistance of a man who has had plant experience.

The erection of a new building at the beginning has many advantages and is usually advisable if the capital is available. A new building of modern construction will serve as an advertisement, and if there is much competition it will be found that an up-to-date plant is a big asset. Such a plant will attract the attention of the public and will be a great aid in getting the business established. Visitors to such a plant are well impressed, and in this way new business is more easily procured.

Unless a satisfactory building can be purchased at a saving of at least half of the cost of erecting a new building, together with the cost of the lot, it usually will be better to rent a building temporarily until a new one can be constructed, as the advantage accruing from the proper construction and arrangement of a new building would easily overbalance the difference in cost.

LOCATION OF A MILK PLANT.

If a new building is to be erected, the site should be carefully selected. Whether to erect a plant on an expensive site in the business section of the city or to go further out, where property is less expensive, is an important question to be decided. If much competition is to be encountered, an attractive and prominent location is of value from an advertising standpoint. An attractive plant located in the down-town section of the city or on a prominent street is not only a good advertisement but often results in a large quantity of cash sales at the plant. However, it is not good policy to buy a very ex-

pensive site unless competition and the retail sales at the plant will be of considerable importance. In a small or medium-sized town the site should not cost as much as the building. In general, a site must be selected where good drainage and sewer arrangements can be had, as well as an abundant water supply and electricity for light and power.

The advisability of selecting expensive property in the business section will depend on the local situation. As a general rule, this is unnecessary if a suitable location can be obtained a short distance away at a considerable less cost.

TYPE AND CONSTRUCTION OF BUILDING.

The type of building to be selected of course depends a great deal upon local conditions. It is desirable to have a building that is modern and sanitary in every way, both from the advertising standpoint and as regards economy and public health.

In general, the building should be sanitary and up to date, attractive in appearance inside and out, with a convenient arrangement of floor space. In selecting the materials for construction, local conditions must be considered. A permanent building is essential and a wooden structure is usually not advisable. Whether to use brick, concrete, or some other material will depend somewhat upon the local situation as to cost of materials and labor. Brick, concrete, and hollow tile finished with stucco on the outside and cement on the inside are the most common materials used. All of these materials are comparatively permanent and can be constructed practically fireproof. They are much more desirable than wood, and the cost of upkeep and repair is much less.

The floors in the plant should be of concrete and properly laid. Where cans and trucks are rolled constantly over the floor, iron plates may be embedded in the cement to protect the floor. Drainage pipes should be put in place before the floors are laid and sanitary traps should be installed in such places as will provide good drainage in the various rooms.

Plenty of natural light is essential, and no expense should be spared in providing many windows.

Good ventilation is also essential in a milk plant. While windows may provide satisfactory ventilation in small plants, medium-sized and large plants should have some system of artificial ventilation. This may be accomplished by such devices as exhaust fans, ventilating flues, and ventilating shafts.

The type of building will depend on the site and on the equipment selected. The equipment, therefore, should be selected before the plans for the building are made. It is generally advisable to build

a large plant of about two to three stories, so that the milk may flow by gravity from the various pieces of equipment in the plant. There is very little advantage in having a plant of greater height than two and one-half or three stories unless the site is very expensive. The labor required to operate a plant of several stories is usually considerably greater than in a lower building because of the necessity of having a foreman for each floor. Small plants may be only one story high, and one-story buildings can often be remodeled into a satisfactory milk plant with less labor required for their operation than in the case of a two-story plant.

ARRANGEMENT OF THE PLANT.

The rooms in the plant should be divided and laid out so that the plant operations can be carried on with the minimum of labor and machinery, and so that the milk may be handled in a sanitary manner. Plans should be drawn by a competent architect, showing the layout of the rooms and the location of the machinery and equipment. These plans should be carefully studied, and before the final arrangement is decided they should be submitted to the local health officials for approval.

RECEIVING ROOM.

The milk-receiving room should be separate from the other rooms and should be well screened to keep out flies. This room should be located so that the milk may be conveniently received direct from the producers' trucks. The floor of the receiving room should be on a level with the floor of the ordinary truck. A convenient arrangement is to have the floor of this room elevated about 3 or 4 feet, so that the milk may be readily received and dumped into the weigh can, from which it may flow by gravity to a receiving vat. If this is not feasible, the receiving vat may be lowered below the floor level. The receiving room should contain scales, weigh can, sample jars, etc. In the receiving room or in an adjoining room facilities for properly washing and sterilizing the cans should be provided, so that the cans may be returned to the producers in good condition. Apparatus of ample size should be provided for cleansing the cans quickly and thoroughly.

WASHING AND STORAGE ROOMS FOR BOTTLES.

The bottle-washing room should be so located that the empty bottles can be received as conveniently as possible from the delivery wagons. This room should be of ample size to provide space for the bottle-washing machine and plenty of room for the workmen. Where the bottles are held for a time before washing, the room must be

larger than where the bottles pass directly from the delivery wagons to the bottle washer.

A clean bottle-storage room is of considerable advantage for storing bottles after washing. This room should be located between the bottle-washing room and the bottle-filling room. In this room the bottles are allowed to remain after washing until cooled, when they may be filled. It is important that there be no congestion either at the milk-receiving door or the door where the empty bottles are received. Therefore, these two doors should be widely separated.

PROCESSING ROOM.

The milk-processing room may contain the pasteurizing equipment and the bottle-filling apparatus, or the bottle filling may be done in a separate room. Where a bottle-storage room is not provided there must be space in the filling room for the empty washed bottles. A convenient arrangement may be accomplished by having the pasteurizing equipment on a half-story or raised floor, so that the milk may flow from it by gravity through the cooler to the bottle-filling apparatus. On the floor above should be placed the milk-storage vats. Gravity flow of milk is preferable to the use of milk pumps. The only milk pump required with an elevated-floor arrangement is one to raise the milk from the receiving tank on the ground floor to the storage tank above.

MILK-STORAGE ROOM.

A well-insulated milk-storage room is necessary in all milk plants. This room should be insulated with about 4 inches of cork, with cement on the inside and outside. It should be located so that the milk may pass directly into it from the bottling room and, at the same time, be convenient for loading the delivery wagons. The door should swing outward, in order to save refrigeration space, and it is well to have the room as nearly square as possible. The size of the room will depend on the quantity of milk to be stored. There should be enough room to store conveniently all the milk of one day's run with convenient working space.

The following are the approximate sizes of milk-storage rooms required for plants handling various quantities of bottled milk.

Quantity of bottled milk handled.	Size of room.
Gallons.	*Feet.*
300	8 by 8
500	10 by 10
1,000	12 by 15
2,000	18 by 20
4,000	24 by 30

A convenient arrangement for loading the delivery wagons may be provided by having small doors placed in the outer wall of the milk-storage room, so that the wagons can be loaded directly at these doors. To do this the room should be placed next to an outer wall, with driveway for the delivery wagons.

EQUIPMENT OF THE PLANT.

Equipment for a milk plant must be carefully selected. In some cases used equipment can be purchased, but it is usually not a good plan to buy secondhand equipment unless it is in very good condition. When a business is taken over, or when several small dealers combine, considerable used equipment is usually available. However, much of this equipment may not be suitable or of the proper size or capacity, and it may be better to sell or discard it than to try to use it. Some of the equipment may be used for a short time until new equipment can be obtained; for example, a small bottle washer may be used until a larger and more suitable one can be purchased. Usually pasteurizers and bottle-filling machinery should be bought new, and much care should be used to procure the best available. Of course, secondhand bottles, cans, cases, etc., can be used. The advice of persons of experience is necessary when the purchase of secondhand equipment is contemplated or when new equipment is selected. The following are some of the points to be considered in selecting milk-plant equipment:

(1) Simplicity. The number of working parts should be as few as possible to do the required work efficiently.

(2) Ease of cleaning. There should be a minimum of inaccessible parts, for they make daily cleaning difficult.

(3) Ease of sterilizing. It is important that all milk apparatus be sterilized daily. The more easily this can be done the more likely it is that the work will be done properly.

(4) Ease and economy of operation. Unless a machine can be operated economically, it will be a liability to the user rather than an asset. If it can be operated easily much less attention will be required.

(5) Durability. Apparatus of poor quality usually is most costly in the end; durability is an important factor.

(6) Initial cost. While cheap apparatus may cost the most in the end, it is not always necessary or advisable to buy the highest-priced equipment.

(7) Efficiency. In the case of pasteurizers, efficiency in holding the milk at a certain temperature should be considered. It is very important in pasteurization that the milk be positively held at 145° F.

for 30 minutes. It is important that equipment of ample capacity to handle the maximum output of the plant be selected. However, the pasteurizers should not be so large that they will wear out and depreciate before the business is developed to the point that large-capacity equipment is required.

For small plants the work must be so arranged that men can be shifted from one kind of work to another, while in larger plants more specialization in the plant operations can be maintained. For this reason the equipment in small plants must be large enough to permit the pasteurizing and bottling to be done in from two to four hours, leaving the remainder of the day for other work.

LISTS OF EQUIPMENT.

Below are lists of the principal equipment required for milk plants, grouped as follows: (1) Small plants, less than 250 gallons daily; (2) medium-sized plants, 250 to 1,000 gallons daily; and (3) large plants, over 1,000 gallons daily.

(1) Equipment for small plants (less than 250 gallons):

- Platform scale (double beam).
- Temperature recorder.
- Pasteurizing vat (100 to 300 gallons capacity).
- Tubular cooler (if milk is cooled in the vat, cooler may be eliminated).
- Small bottle filler (a filler designed to fill four bottles at a time is satisfactory).
- Bottle washer (consisting of a turbine brush with rinser and steamer).
- Bottle cases (about two sets of cases will be required).
- Cans (cans for delivery of milk to wholesale trade; farmers should provide cans for bringing the milk to the plant).
- 10 to 15 horsepower boiler.
- 3 to 5 horsepower motor.
- Brine tank.
- Can wash sink with steam jet.
- Small separator (about 2,000 pounds per hour).
- Small churn (100 pounds butter capacity).
- Milk storage room (a room of about 6 by 8 feet provides enough space to store one day's supply of bottled milk).
- Babcock tester (12-bottle size).
- Steam and water hose with fittings.
- Steam and water piping.
- Milk pump (if gravity is used no pump is required).
- Sanitary milk piping and fittings.
- Belting, shafting, pulleys, hangers, etc.
- A supply of bottles, caps, washing powder, coal, etc.

(2) Equipment for medium-sized plants (250 to 1,000 gallons):

- 5-beam platform scale or a dial scale.
- 2-compartment weigh can.
- Receiving vat (200 to 400 gallons capacity).
- Sanitary milk pump (capacity 6,000 pounds per hour).

(2) Equipment for medium-sized plants—Continued.
Clarifier (6,000 to 8,000 pounds per hour). This may be eliminated if a satisfactory filter or strainer is provided.
Sanitary milk piping and fittings.
Pasteurizing and cooling outfit (capacity about 4,000 pounds per hour, including recording thermometers and temperature control).
1 or 2 automatic fillers and cappers (separate filler for buttermilk should be used).
1 hydraulic bottle washer.
1 small bottle washer with turbine brush.
1 can washer, rinser, steamer and dryer.
1 forewarmer.
1 separator (2,000 to 4,000 pounds per hour).
1 combined churn and butter worker (churning capacity 150 gallons of cream).
1 butter printer, etc.
1 vat with coil, for buttermilk (about 300 gallons).
1 starter can.
1 300-gallon cheese vat.
1 drain rack.
Trucks and conveyor track.
1 5 to 10 ton refrigerator outfit with brine tank, brine pump, etc.
1 steam boiler (20 to 40 horsepower).
Motors (10 to 20 horsepower).
1 steam engine (12 to 20 horsepower). Direct-connected motors may be used on some of the machinery and if desired all power may be provided by motors.
Chemical and bacteriological apparatus.
Cans.
Bottle cases.
Shafting, belting, hangers, pulleys, etc.
Steam and water piping and fittings.
Steam and water hose and fittings.
Supplies of bottles, caps, washing powder, etc.
(3) Equipment for large plants (more than 1,000 gallons).
5-beam platform scales or dial scale.
1 can drainer.
1 double-compartment weigh can or quick-dumping weigh can.
2 receiving vats (400 to 600 gallons each).
Sanitary milk pump.
Sanitary milk piping and fittings.
1 forewarmer.
1 or 2 clarifiers (8,000 to 12,000 pounds capacity) or an efficient filter.
1 or 2 insulated milk-storage tanks.
1 or 2 separators (8,000 to 12,000 pounds capacity).
Pasteurizing and cooling outfit (capacity 6,000 to 10,000 pounds per hour), including recording thermometers and temperature control.
1 small pasteurizer for cream.
1 small tubular cooler.
2 to 4 automatic fillers and cappers.
1 large hydraulic bottle washer.
1 small bottle washer with turbine brush.
1 can washer, rinser, steamer, and drier.

(3) Equipment for large plants—Continued.

1 combined churn and butterworker (churning capacity 300 gallons of cream).
Butter printer, ladles, packers, etc.
Trucks and conveyor track.
1 starter can.
1 special exhaust-steam heater and storage tank (to supply hot water for pasteurizing and washing purposes).
1 300 to 600 gallon ripener.
1 to 2 cheese vats (300 gallons capacity).
2 drain racks.
Curd knives, curd pails, paddles, and whey strainer for cottage-cheese making.
Buttermilk vats (300 to 800 gallons capacity).
Refrigerating equipment (20 to 40 tons), with compressor, condenser, brine tank, brine pump, and all necessary piping and fittings.
Boilers (60 to 200 horsepower).
Engine (40 to 80 horsepower).
Motors (30 to 100 horsepower).
Milk cans, bottles, and cases.
Belting, shafting, pulleys, hangers, steam and water piping and fitting, etc.
Chemical testing apparatus.
Bacteriological testing apparatus.

OFFICE EQUIPMENT.

Besides the equipment listed, office equipment will be required. Small plants require only a desk with chairs and possibly an adding machine, check protector, and a safe. Large plants require, in addition, typewriters, computing machines, addressing machines, filing cabinets, and most of the equipment required in a modern business office.

DELIVERY EQUIPMENT.

The delivery equipment required depends on the kind of trade served and its accessibility. Automobile trucks often may be used economically in serving wholesale trade. Where considerable territory has to be covered and for very scattered retail trade the automobile may be used economically. Use of horse and wagon, however, is the most common and satisfactory method of delivering to retail trade. It has many advantages over the automobile. One man can deliver a load of milk from a horse-drawn wagon, but usually at least one extra man will be required on an automobile truck. The constant stopping and starting necessary on a retail milk route is not favorable to the use of an automobile for such delivery, although recently electric-driven trucks are giving economical service.

The quantity of goods that can be delivered from a wagon or truck depends primarily on how scattered the trade is, the method

of delivery, whether many flights of stairs must be climbed, etc. In the ordinary city, where there is more or less competition, about 250 to 300 quarts of milk, with the usual quantity of cream and other dairy products, are commonly carried on a retail wagon. For wholesale trade one delivery outfit will handle 500 to 1,500 quarts, depending on the type of streets, distance apart of the customers, and similar factors.

INVESTMENTS IN PLANT AND EQUIPMENT.

If a building is rented or bought it must be remodeled to fit the requirements of the business and this remodeling will cost, depending on the size and condition of the building, from $500 to $5,000 or more. The rental of a building will, of course, depend upon local conditions, location in the city, on size of building, etc., but this will usually vary from $30 to $150 per month.

The money that must be invested in a new building will depend on the quantity of milk to be handled, materials of construction used, cost of labor, local conditions, etc. Table 1 shows the investments in plant building at 27 representative producers' milk plants of various sizes located in various cities throughout the country. While there are wide variations in cost, caused by lack of standardization of buildings, varied materials used, and other factors, these figures will give a general idea of the approximate amount of money that will have to be invested in a building.

The cost of milk-plant equipment depends on the quality and size and the cost of transportation. In Table 1 are also shown the investments in plant equipment in 27 producers' cooperative plants of various sizes.

TABLE 1.—*Investments in plant and equipment at 27 producers' cooperative milk plants, arranged according to quantity handled.*

Size of plant (gallons handled daily).	Number of plants.	Average number gallons handled daily.	Investment in plant.		Investment in plant equipment.	
			Average per plant.	Average per gallon.	Average per plant.	Average per gallon.
500 gallons or less	9	413.9	[1] $10,000.00	[1] $25.97	$11,811.21	$28.73
501 to 1,000 gallons	7	793	[2] 18,977.87	[2] 22.77	25,208.68	31.79
1,001 to 2,000 gallons	5	1,760	[2] 22,515.76	[2] 11.69	[3] 20,933.77	[3] 11.89
2,001 to 8,000 gallons	6	4,199.66	94,750.25	19.14	60,960.15	12.34
	27	1,602.7	36,339.02	19.45	26,624.28	16.97

[1] Only 5 plants in this group had buildings of their own.
[2] One plant in this group rented a building.
[3] One plant in this group handled mostly all wholesale.

TABLE 1.—*Investments in plant and equipment at 27 producers' cooperative milk plants, arranged according to quantity handled*—Continued.

Size of plant (gallons handled daily).	Number of plants.	Investment in delivery equipment.		Total investment.	
		Average per plant.	Average per gallon.	Average per plant.	Average per gallon.
500 gallons or less	9	$2,893.75	[1] $6.66	[2] $21,433.44	[1] $51.70
501 to 1,000 gallons	7	11,185.79	14.07	[3] 49,985.43	[3] 63.04
1,001 to 2,000 gallons	5	7,146.06	[4] 4.33	[3 4] 49,482.13	[3 4] 28.11
2,001 to 8,000 gallons	6	19,475.25	[5] 5.21	[5] 155,136.34	[5] 36.97
	27	8,556.39	7.02	63,749.18	39.54

The average investment in plant buildings at 84 privately owned plants ranging in size from 100 gallons to over 10,000 gallons daily was $24,183, and the average investment per gallon handled daily was $13.27 based on 1916 prices. See U. S. Department of Agriculture Bulletin No. 849.

The average investment in plant equipment at 125 privately owned plants ranging in size from 100 gallons to over 10,000 gallons daily was $24,475, and the average per gallon handled daily was $11.59, based on 1916 prices. See U. S. Department of Agriculture Bulletin No. 890.

[1] One plant in this group had no delivery system.
[2] Only 5 plants in this group had buildings of their own.
[3] One plant in this group rented a building.
[4] One plant in this group handled mostly all wholesale.
[5] Two plants in this group had no delivery system.

Below are estimates of the approximate cost of the principal plant equipment for plants of various sizes. These figures include the cost of the principal equipment required, together with an initial supply of cans, bottles, cases, etc.

100-gallon plant, $1,500 to $2,000.
500-gallon plant, $4,000 to $6,000.
1,000-gallon plant, $15,000 to $25,000.
2,000-gallon plant, $25,000 to $35,000.
4,000-gallon plant, $45,000 to $60,000.

The following is an estimate of the cost of delivery equipment, not including stable or garage.

100 gallons, $500 to $700.
500 gallons, $3,500 to $4,000.
1,000 gallons, $5,000 to $8,000.
2,000 gallons, $10,000 to $15,000.
4,000 gallons, $20,000 to $30,000.

In Table 2 are given estimates of the amounts of money required to establish and operate plants of various sizes. While these figures show great variation, a general idea of costs may be obtained from them.

TABLE 2.—*Estimated amounts of money required to establish and operate plants handling various quantities of milk daily.*

Number of gallons to be handled daily.	Building.	Rent of building per month.	Plant equipment.	Delivery equipment.
100 to 250	$1,500 to $6,000	$25 to $50	$1,500 to $5,000	$500 to $2,000
250 to 500	4,000 to 10,000	40 to 75	3,000 to 8,000	1,200 to 3,500
500 to 1,000	10,000 to 18,000	60 to 100	6,000 to 20,000	2,500 to 7,000
1,000 to 2,000	15,000 to 25,000		15,000 to 35,000	5,000 to 14,000
2,000 to 4,000	18,000 to 50,000		25,000 to 50,000	10,000 to 28,000

TABLE 2.—*Estimated amounts of money required to establish and operate plants handling various quantities of milk daily*—Continued.

Number of gallons to be handled daily.	Office equipment.	Working capital.	Total.
100 to 250	$50 to $300	$300 to $750	$3,850 to $14,050
250 to 500	200 to 600	750 to 1,500	9,150 to 23,600
500 to 1,000	500 to 1,000	1,500 to 3,000	20,500 to 49,000
1,000 to 2,000	1,000 to 1,800	3,000 to 6,000	39,200 to 81,800
2,000 to 4,000	1,500 to 2,500	6,000 to 12,000	60,500 to 142,500

For detailed information regarding construction, arrangement and equipment of city milk plants see U. S. Department of Agriculture Bulletins Nos. 849 and 890.

MANAGEMENT OF MILK DISTRIBUTING PLANTS.

The success of business organizations is largely dependent upon competent management. A milk-distributing plant is no exception to the general rule. In fact, milk distribution is a business of many details and success is dependent upon the ability of the manager to organize and conduct the business so that every detail is properly performed.

In cooperative milk-distributing organizations, the necessary legal and supervisory authority is vested in the board of directors, who are elected by and from the members or stockholders. The business management and supervision of the milk-distributing plant is intrusted by the board of directors to the business manager. Where the business is large and it is impossible for the manager to supervise personally each operating branch, superintendents, foremen, or managers of the various departments are employed. Thus the operation of a milk-distributing plant may be divided into such departments as buying, receiving, processing, bottling, manufacturing, accounting, and sales. In such an organization of the business of a milk-distributing plant, the manager must have superior executive and administrative ability, so that the highest possible standard of efficiency may be obtained in each department and each department's activities correlated with the others, to the end that a unified, systematized, efficient operation of the entire business may prevail.

QUALIFICATIONS, DUTIES, AND RESPONSIBILITIES OF MANAGERS.

The qualifications for a milk-plant manager in education, training, and experience depend in a large measure upon his duties and responsibilities, which necessarily vary with the size of the business. Ordinarily, he is expected to formulate the policy and basis for determining prices at which different grades of milk, cream, and by-products are to be sold to different classes of trade. The manager

should obtain all available information regarding the present and prospective local market demands and sources of market supply. He should formulate and execute plans for the most economical methods of collecting, processing, and manufacturing by-products, and of selling and distributing the products of the plant. In order that he may justly be held responsible for the successful conduct of the business as a whole, he should have authority to employ and discharge all labor.

In small and medium-sized plants, where it may be necessary for the manager to give direct personal supervision to the many minor details, and where he may be required to put his hand to any task, it is obviously desirable for him to be thoroughly experienced and able to handle every physical and mechanical detail. In larger plants the responsible supervision of the detail work in the milk-handling department is intrusted to a plant superintendent or foreman, and the larger duties of the manager are executive and administrative, having to do more with questions of business policies which require a knowledge and training in business administration than with factory detail which requires technical training supplemented by factory experience. It is always desirable that the manager have an extended knowledge of, and be familiar with, detail plant operations, in order that he may be fully conversant with the problems of the various departments of the business and be able to formulate plans and policies with the various superintendents for the more efficient and economical conduct of their departments.

The duties of a milk-plant manager in small plants obviously may be numerous and varied, while in larger plants they become more executive in character, with the routine and detail duties performed by other employees. In small plants the overhead costs, including salaries of manager and employees, must be kept at a minimum; hence the manager may be obliged to perform much manual labor in addition to supervising the work of other employees.

The manager of a milk-distributing plant has perhaps greater responsibilities than any other employee. In small plants he is obliged to assume full responsibility for all work done, while in larger plants this responsibility may be shared with the superintendents and foremen.

The manager in every plant, whether large, medium, or small, must be in close touch with each operating department, for responsibilities can not be assumed safely unless the activities of the departments are conducted in accordance with well-defined policies. He must also have access to reports or records of the entire business, in order to formulate plans and policies for its successful conduct.

SELECTING A MANAGER.

In considering the employment of a milk-plant manager, his qualifications in reference to all factors which make for the success of a milk-distributing plant should be considered. Where the organization is newly formed and a plant must be constructed and equipped, it is usually desirable to employ the manager early, so that his advice in matters of arrangement and equipment may be obtained and that he may have ample time to determine upon best plans and policies for the conduct of the business before it is undertaken.

In selecting a manager due consideration should be given by the board of directors to the local conditions and problems to be met. Previous successful experience along business lines of the same or a similar character is a valuable asset, as are dairy-school training and a knowledge of the manufacture of by-products.

The employment of a manager largely because he is willing to accept a lower salary than others is a mistake to be avoided. Quality of service and price should be as much coordinated in the person of a competent manager as in the product produced and sold by the milk-distributing plant. Experience in the sale or manufacture of milk by-products, such as butter, cheese, ice cream, and condensed milk, does not necessarily qualify a man for the position of manager of a market-milk distributing plant. Milk by-products are less perishable than milk and their sale does not involve such a highly organized house-to-house distributing system as market milk. By-product marketing does not often afford experience in retail-route administration nor in the intensive development of new business such as is required in a milk plant. Competent milk-plant managers are in active demand everywhere. In small plants they receive salaries of $6 to $10 per day or above, which in fact are scarcely above those of capable workmen, whose responsibilities may be considerably less. Managers' salaries in large plants range from $2,400 to $6,000 and above per annum (either straight salary or salary and commission) and are based not so much on the size of the business as on the results or success obtained.

Frequently such agencies as the State colleges of agriculture, State dairy and food commissioners, the United States Department of Agriculture, dairy and creamery equipment and supply houses, and dairy trade journals have knowledge of persons capable of managing milk plants and are able to give assistance in locating them. They also may be secured from the ranks of successful small-plant managers or department superintendents in large plants.

PROBLEMS IN OPERATING MILK-DISTRIBUTING PLANTS.

The foregoing statement regarding the duties and responsibilities of a milk-plant manager indicates that he may have many problems with which to deal. For the purpose of separate discussion of the more important phases of each, they will be considered under the following classification:

(1) The securing of an adequate and proper milk supply.
(2) Efficient and economical plant operation.
(3) Sales policies and methods of market distribution.

As consideration is given to each of these, it is well to keep in mind that the manager is responsible to the board of directors, and he should cooperate with it on all matters involving business policies and seek to obtain counsel and advice in formulating them.

THE SECURING OF AN ADEQUATE AND PROPER MILK SUPPLY.

Three problems arise in every milk plant, in obtaining a milk supply. These are (1) source of an adequate supply, (2) maintaining proper quality in the supplies received, and (3) determining upon an operating policy which largely eliminates financial risks and losses.

In cooperative plants, the larger part of the supply is usually received from the patron members, but usually not to the entire exclusion of the product of nonmembers. A closed organization against nonmembers is often not desirable, even though patron members may be able to furnish an adequate supply. By providing a satisfactory market for dairy products, *the establishing of competing plants is discouraged* and production is encouraged. In practically every plant it is necessary to operate a by-products department, in which the surplus supplies may be manufactured into butter, cottage cheese, and other products. Although by-products may be sold ordinarily at lower net prices and on narrower margins than market milk, the overhead costs of the plant may be reduced by increasing the volume of product handled. Also, the handling of a surplus allows opportunity for expansion of sales in the milk department.

To obtain adequate supplies of milk of highest quality, country collecting routes are often employed in reaching patrons in neighboring sections, and receiving and cooling stations are operated at points from which delivery is made by rail or by motor truck. Certain advantages are often obtained by the operation of collecting routes, for the milk is picked up at the farm and needless duplication in delivery by individual producers is eliminated.

The ordinary charge for collecting, which includes the return of empty cans, may range from 1 to 5 cents per gallon, depending upon local conditions.

Closely related to the problem of obtaining an adequate supply is that of maintaining proper quality in the supplies received. Much may be accomplished in improving the quality of the supply received by educational work among the producers and by offering incentives in the price paid the farmer for the production of the better qualities. Constant attention, both at the plant and on the farm, should be given to the quality of milk furnished by each producer, and frequent tests should be made to determine the purity and butter-fat content. Premiums based upon the butter-fat content, absence of sediment or visible dirt, and low bacterial count may be used to encourage delivery of highest quality. The written contracts entered into by the organization and its producers may specify the temperature to be maintained and time of delivery, as well as the time, frequency, and basis of payment.

The consuming public is coming more and more to appreciate high quality in dairy products and is demanding it. Poor quality is frequently the cause of loss of patronage and failure of milk-distributing plants. High quality is the first essential in obtaining and maintaining patronage. It begins at the farm and must not be neglected either there or at any point between the producer and consumer. Good quality and good service are essential to obtaining an increased business.

In cooperative milk-distributing plants the problem of determining upon a satisfactory price agreement with the producer should not be difficult, since price policies are largely determined by the board of directors in conference with or as representatives of the patron members. Furthermore, an agreed margin between producer and consumer prices may be established and any surplus arising may be distributed back to the producers on a pro rata basis, or, what is perhaps better, the plant may be operated on a net-return basis.

Although at some producers' cooperative milk-distributing plants the practice of purchasing the milk from the producer at a stipulated price is followed, the plan of prorating the proceeds for certain periods to the patrons in accordance with raw materials furnished, after deducting necessary charges for operating expenses and reserve, is to be preferred. The producer who realizes that he is a part of an institution which is truly cooperative should be in hearty accord with this method. If the milk is purchased outright at a definite price, the margin between this price and that charged the consumer on account of unforeseen conditions may not be sufficient to provide for the expense of operation. It is impossible at times to foretell how much of the milk delivered during any month will be required for the whole-milk trade and how much must be manufactured into by-products. While an organization that purchases the milk from

the producer might suffer a loss under such circumstances, the producer would not be a gainer, because, being a part of the organization, he would have to bear his part of the loss eventually.

The advantages of the truly cooperative method of payment, that is, prorating the net proceeds in accordance with raw materials furnished, should be carefully considered, for under this method questions of surplus milk may be adjusted without difficulty. Furthermore, the prorating of net proceeds has been employed successfully by many other cooperative organizations, such as cooperative creameries and cooperative fruit and vegetable marketing organizations, and should be equally satisfactory when used in cooperative milk-distributing plants.

EFFICIENT AND ECONOMICAL PLANT OPERATION.

Internal economy in plant operation is a detail feature of business management largely dependent upon the systematic organization, ability, and ideals of the employees, the arrangement and construction of the plant, and the arrangement, capacity, and efficiency of the equipment. The importance of proper plant construction and equipment has been previously discussed and should not be overlooked in the construction and equipment of new plants or the remodeling and equipment of old ones.

Systematic plant organization, with competent, able, and willing employees, is an important factor in obtaining efficient and economical plant operation. Every part of the work should be properly coordinated, to the end that needless waste of supplies and labor may be eliminated. Plants of sufficient size to warrant the employment of a plant foreman or superintendent should have one. The duties of a plant foreman or superintendent are largely supervisory, directing the employees in the plant in the proper performance of their duties, whether it be in weighing, testing, or inspecting the supplies received, pasturizing and bottling the milk and cream, and washing and sterilizing the bottles, vats, or plant equipment. In plants where a plant engineer is not regularly employed, he supervises the proper operation of the boiler, engine, motors, and refrigerating equipment, and whatever detail work is done in the holding of products in the refrigerator or cold-storage room for delivery on routes, or in the manufacture of by-products. It is obvious that competent supervision with systematic organization and high ideals are essential for the most efficient and economical operation of a milk plant.

SALES POLICIES AND METHODS OF DISTRIBUTION.

Local market conditions must be the chief deciding factor in determining the sales policies and methods of distribution in a milk-distributing plant. Quality, however, should be the first considera-

tion in the sales policies. A deep cream line on bottled milk and the thickness or viscosity of bottled cream are important factors in developing new business. A deep, distinct cream line often outweighs all other considerations with consumers, since to them it is a visible and tangible evidence of quality and a daily indication of the business standards of the company. It therefore is important not to diminish the cream line on the bottled milk by the adoption of a low butter-fat standard or by the selection of poor pasteurizing equipment or by improper processing methods.

In establishing a new plant it is important that outlets of sale be developed and methods of distribution be determined before delivery equipment is purchased or contracts for large supplies of milk are made. In this matter it is well to proceed carefully and cautiously, for if complete equipment for an extensive system of retail distribution be purchased and it is later found advisable to employ largely a wholesale system through retail stores, not only will much of the equipment be unnecessary, but it will not be suitable for wholesale delivery. A thorough canvass of the market situation should be made, including the trade demands and requirements, and when profitable outlets are doubtful the establishment of the plant should be postponed until they are assured.

A nucleus for retail and wholesale business may be secured by consolidation of routes discontinued by the patron members or by the purchase of the business and good will of independent dealers. The initial operation of a milk-distributing plant is usually the most critical period in its existence, and failure to solve the problem of sales organization and methods may result in insolvency unless adequate capital has been provided to carry the organization along until sufficient sales business has been developed to cover the heavy overhead costs and make possible the development of a profitable business.

The channels of distribution may be classified as follows:

(1) Direct to consumer by house-to-house delivery.
(2) To consumers through retail stores.
(3) To consumers through hotels, cafés, refreshment stands, etc.
(4) To other dealers who may employ the previously mentioned channels.

The direct-to-consumer channel of distribution by house-to-house delivery is most expensive, although a larger cash return is obtained, as higher prices are charged, and usually a larger permanent business may be obtained, since a satisfied customer may be made a permanent one. Then, too, delivery direct to consumers' doors eliminates certain competition which may result from sales to retail stores. Direct-to-consumer delivery has certain obvious advantages, and where the

retail-route organization may be perfected to the point of permitting large loads (350 to 450 quarts) the overhead costs may be reduced to a minimum.

Distribution through retail stores is a channel employed wholly or in part by milk-distributing plants in many cities. Its advantages are lower costs of delivery expense and usually lower prices to consumers, especially at cash-and-carry stores. Its disadvantages consist of increased competition in selling, and the inconvenience, time, and effort required by consumers to obtain their daily supplies.

Hotels, restaurants, cafés, and refreshment stands ordinarily buy both bulk and bottled goods at wholesale prices, which range lower than retail prices.

Sales to other dealers, who operate either or both retail and wholesale routes, is a method of distribution employed by some milk plants. Such sales are at wholesale and may be made to independent dealers.

Economy in retail-route distribution is dependent upon reduction of route mileage and increase in size of load handled by each route man and upon the extent that the sales organization is able to obtain greater efficiency. Endless duplication of equipment, excessive overhead expense, and needless street travel by many route men of competing distributing plants have been pointed out as a great waste in milk distribution. This could be eliminated by a centralized system of distribution, with one plant handling the city's entire supply.

The average load carried on retail routes averages usually from 250 to 300 quarts per day, while in exceptional cases as many as 350 to 400 quarts are delivered from one retail wagon. However, it is entirely possible for one route man, serving all customers on both sides of the street in closely settled sections of cities, to average 400 or more quarts daily.

An efficient delivery system is just as important to the success of a milk plant as is the quality of its products. Retail routes are usually operated by a delivery man using a one-horse retail wagon or a light motor truck. A retail delivery man, under ordinary conditions, is able to supply 200 to 400 customers a day. Four to 10 routes are generally supervised by a route foreman, and in large companies a sales manager supervises the work of the foremen. Credit men, solicitors, collectors, loaders, and checkers are employed in some delivery organizations.

In larger milk plants, operating five or more routes, it is commonly advisable to place the delivery system under the supervision of a sales manager, with route foremen in charge of a number of routes, say from 5 to 10. The sales manager supervises the route foremen and such additional employees as solicitors and collectors, while the plant superintendent supervises the loaders and checkers.

In small plants the general manager assumes the responsibility of the sales manager and depends upon the plant superintendent to supervise the loaders and checkers and the route foremen or route men for the proper delivery service.

In the larger plants wholesale milk is generally sold on routes that handle wholesale orders exclusively, and retail milk is distributed on exclusively retail routes. Although both the wholesale and retail routes may cover the same territory, separate deliveries are made, because a different kind of service and different hours of delivery are required by wholesale and retail trade. The separation of wholesale and retail sales also simplifies accounting, balancing of load sheets, and the checking of returned bottles and cans. In smaller plants the routes usually handle both wholesale and retail milk on the same wagons.

In cities located in the northern part of the country daylight deliveries are made throughout the spring, fall, and winter seasons, and in the summer deliveries are usually made before daylight. Where one company handles practically all the city distribution, it may be possible to maintain a system of daylight delivery throughout the year. In some southern cities it is customary for milk dealers to make two deliveries a day.

ROUTE SALESMEN AND DELIVERYMEN.

The success of any mercantile business depends upon its ability to sell goods. The successful sale of milk through milk plants depends upon the efficiency of its sales methods. After the general sales policy of a milk plant is approved by the board of directors the manager must determine the methods to be employed in putting it into operation, while the actual selling is intrusted to the sales and delivery organization.

The route men of a modern milk company are more than delivery men. They are, in fact, business representatives who by their relations to the customers, by their speech, and by their personal appearance express the general attitude of the company toward the public in business standards and business ideals. Good will may be either developed or destroyed by the employment of the right or wrong kind of route salesmen.

Route salesmen and delivery men may come from many different sources. They may vary in age from 18 to 45 years, may be inexperienced, with great or small capacity for self-development; or they may, on the other hand, be experienced and efficient milk salesmen.

Ability to read and write, keep a route book and daily report sheet correctly, understand the instructions given, and appreciate the im-

portance of personal cleanliness are qualifications that should be required. With such qualifications and a good physique as a foundation the possibility of future development into a successful salesman is mainly a problem of organization of the delivery system. A company that does not have a well-formulated standard of service or that neglects to train its route men is more than likely to have just as many different standards of service as it has route men.

The pay of a route salesman must be commensurate with the amount and kind of work required of him. As a general rule the salary of a salesman should compare favorably with the pay of a skilled workman or mechanic. A route salesman who sells 400 quarts daily and makes an effort to build up his route is rendering a service of a higher order than a driver or teamster, and unless he is adequately paid he will eventually seek other employment. The salaries of efficient milk salesmen vary from $25 to $50 per week. A constantly changing personnel of dissatisfied route salesmen precludes efficiency in satisfactory delivery service. The premium or commission system of payment, in which a bonus is offered to salesmen for new customers obtained and for promptness in the collection and return of bottles in addition to basic salary, is the usual method of paying salesmen for efficient service and encouraging them to put forth their best efforts.

Because of the many disagreeable features of route-delivery work there is a tendency among route men to look upon the work as a temporary job until more agreeable employment is obtained. This tendency is often further encouraged by the indifferent attitude of the company toward the route men. Even companies which maintain a most liberal policy toward their salesmen and pay adequate salaries report that only about 50 per cent of their route force can be considered permanent.

Adequate salaries, liberal commissions, and a bonus system of payment, convenient working equipment, and a reasonable amount of time off each month are strong inducements to route salesmen to put forth their best efforts and to continue permanently in delivery work.

Because the net profit on a bottle of milk is usually a small fraction of its selling price, the reduction of credit losses to a minimum is of more importance than in most other lines of business. The advantages and disadvantages of various credit systems, and especially their adaptability to local conditions, should be investigated before any one of them is adopted.

The choice of a cash or credit system, or a modified form of such, will depend upon competitive conditions, prevailing trade practices, and the management of an effective sales organization and distributing system. Reasons for and against may be given for each, but, in general, cash systems have been found to be most economical of op-

eration and losses due to extension of credit are eliminated. The two prevailing systems are: (1) Cash (in advance from retail trade, in which payment for coupon books or tickets is made before the milk is delivered, or on delivery from wholesale trade); and (2) charge accounts, where collections are made weekly, semimonthly, or monthly.

The principal advantages of the cash system are, first, the elimination of uncollectable accounts; second, the elimination of the expense of billing and collecting; third, the reduction of bottle losses. Its disadvantages are the first cost of tickets and the annoyance to patrons in giving the deliveryman the proper tickets at the time of delivery.

The advantages of the charge system are: First, patrons are not inconvenienced by the use of tickets; second, delivery work is facilitated, because the deliveryman is not obliged to collect or check up the tickets; third, it is a convenient method of extending credit. The disadvantages of the charge system are: First, the expense of bookkeeping; second, the loss of bad accounts; third, the higher and more expensive order of salesmanship required on the part of the deliveryman for billing and collcting than in either the cash or cash-in-advance system; fourth, necessity for the service of extra collectors and credit men.

METHODS OF INCREASING SALES.

In new, as well as in old-established plants, it is necessary to be always on the alert for new business. Customers are continually leaving the city or moving to other parts of it and new residents are constantly moving in. Various advertising methods may be employed, the attending success depending upon the care with which they are planned and their timely application. The most effective advertising is of the positive sort or that which emphasizes the healthfulness and food value of milk. Such advertising may be in the form of newspaper articles, billboards, posters, circulars to patrons, and display advertising.

Many milk-distributing plants have offered incentives to their sales force in increasing and extending trade by paying additional commissions or bonuses for new customers, returned bottles, volume of business, collections, or total route sales, as part of the routeman's salary. Some firms employ the policy of consistently extending their business by consolidation with or purchase of the business of competitors. Where the competitor's customers are mostly within territory already covered and can be reached by existing routes, or are in new territory and a nucleus of a route is desired to which other

customers may be added, this method may be profitable, provided the price paid is not exorbitant. Soliciting may be employed where the house-to-house canvassing seems desirable.

COSTS OF MILK DISTRIBUTION.

The costs of milk distribution are dependent upon capital investments in plant and equipment, delivery equipment, and operating expenses both in the plant and in delivery.

Data obtained by careful investigations show that capital investments in plant and equipment range from about $20,000 to $150,000, with an appropriate average of $60,000 for plants handling 2,000 to 5,000 gallons daily. The investment in delivery equipment varies according to the amount of wholesale or retail business and the amount handled on each distributing wagon. It is apparent that when retail wagons cost $200 to $300 each and wholesale wagons $350 to $450 each, and horses $150 to $225 each, and when from 250 to 400 quarts are handled daily on retail wagons and 1,200 to 1,800 quarts on wholesale wagons, the investment on retail wagons may range from $1.25 to $1.75 per quart sold daily and on wholesale wagons from 50 to 75 cents per quart.

Labor costs on retail and wholesale routes vary in different cities and may range on retail routes from 1½ to 2½ cents per quart, with additional costs for horse feed amounting to $1 or more per day or one-fourth to one-third cent per quart. The delivery costs under different local conditions may range from 40 to 65 per cent of the total costs from producer to consumer, which "spread" or margin may range from 4 cents per quart to 6 or 7 cents, and in some instances to 8 cents per quart.

It is impossible to give an average figure which would fairly represent prevailing conditions, for the costs of labor, supplies, and equipment are constantly changing, and conditions are not the same in any two cities. The spread on wholesale sales may vary from 1 to 3 cents less per quart than on retail sales. Thus, with a margin of 3 cents less, and with the assumption that the retail store handles on a 1-cent margin, it is possible for milk to be sold to consumers through stores at 1 to 2 cents less per quart than on retail routes, making house-to-house deliveries.

It should be remembered that under any system of plant operation and sales delivery, costs are largely dependent upon local conditions, the extent to which the business is efficiently managed, and whether detail operations are conducted in an economical manner. Perhaps no one thing is more important for proper management and maintenance of low operating costs than a system of accounts and cost records

which quickly enables the various phases of the business to be analyzed and comparisons to be made, thus giving the best opportunities for policies to be formulated for the greater success of the business.

NECESSITY FOR ADEQUATE ACCOUNTING SYSTEM.

Among the important causes of many business failures in recent years, according to our large commercial reporting agencies, has been a lack of accurate and detailed information concerning the business. Inasmuch as the only reliable source of information concerning business operations is the records kept of them, it would seem that the importance of proper records as an aid to successful management is deserving of more consideration than is ordinarily given the subject. The importance is further emphasized by the statement of a certain national trade association that 85 per cent of the failures in business are due to inadequate bookkeeping. It is the unanimous opinion of those who have made a study of the subject that a very decided improvement must be made in bookkeeping methods before any appreciable decrease can be expected in the present heavy business mortality rate.

In cooperative organizations it is just as essential that adequate and proper accounting records be kept as it is in private and corporate enterprises. Aside from the question of success or failure there are other benefits which may be derived from adequate accounting. Uniformity in the manner in which financial and operating reports are compiled is of great importance. The true progress of a business can be judged only by comparing the results of one year with those of preceding years. Therefore, if it is desired to know the progress that has been made, the reports must be comparable. The reports are not comparable and can not be made so unless the records have been kept on the same bases year by year and all the facts have been recorded. Unless the system is truly adequate, some of these facts are sure to be omitted and thus the entire report rendered worthless.

The preparation of proper income-tax reports, cost statements as a basis for selling prices, wage scales, and the whole operation of the business depend upon information which can be secured only by the use of an adequate system of accounting.

But first it should be determined for a certainty that the system is really adequate. A small number of forms, requiring little work to keep them and purchased at a small initial cost, by no means constitutes an adequate system of accounting. Any system is worthless if it does not supply the information needed to conduct the business properly.

ESSENTIALS OF AN ADEQUATE ACCOUNTING SYSTEM.

The items of information that an adequate system of accounting may furnish are many, but a few of the more important ones will be mentioned.

One important item is the information as to whether the business as a whole has been conducted at a profit or at a loss. This, of course, the books must reveal; but they should reveal much more than the mere fact that a profit or loss has resulted from the operation. They should show which particular part of the operation has been conducted at a profit and which has resulted in a loss. Further, it should be readily seen what particular item of expense or income has had the largest part in accomplishing the result. In order that this may be thoroughly understood, it is necessary to know the exact effect of this item in previous years. This makes it imperative that the statement be prepared on a comparative basis and in a way that will allow each item to be shown side by side with the same item of previous periods.

Another point of information is the balance sheet or statement of the financial condition. This is often thought to be of less importance than the statement of profits. Actually, however, it is of equal if not greater importance, and can reveal an almost untold amount of information when properly prepared and studied. Like the profit-and-loss statement, to be of real value, it must present the financial progress that has been made in addition to the exact financial condition at a certain date. A statement of this kind is fast becoming a necessary part of the information required by many banks in passing upon an application for a loan, and one must be submitted to the Treasury Department as a part of the income-tax report. It should be prepared in the form recommended by the Federal reserve bank, and the accounting system should be so constituted.

In order that two items may be compared, they must be alike. It is impossible to compare items on the financial report at different dates unless they are alike. It means nothing to compare the amount expended for repairs this year with that of last year, unless it is known that exactly the same kind of items have been charged to the open account each year. It is imperative, therefore, that the same ledger accounts be kept in exactly the same manner over a period of years if any reliance is to be placed on the reports. Often it is desirable to compare the results obtained by another organization in the same line of business. This is impossible unless the two organizations use a uniform and standard classification of ledger accounts. These accounts should be so arranged in the ledger that the statement just referred to can almost be prepared

by copying onto a form the balances of the accounts in the order in which they appear in the ledger.

ESSENTIAL RECORDS FOR AN ADEQUATE ACCOUNTING SYSTEM.

The necessary records comprising an adequate system for milk-distributing plants may be classified briefly into:

1. Receiving records.
2. Purchase records.
3. Driver's records.
4. Sales records.
5. Receipts and disbursements records.
6. Accounts receivable records.
7. Pay roll.
8. Storeroom records.
9. The journal and ledger.
10. Statistical records.

The number of forms required for the keeping of these records depends to a large extent upon the volume and complexity of the business. Plants operating in the large cities, receiving their milk supply by rail from receiving stations located at distant points, and operating many routes, milk depots, and retail stores in the city, require a much more detailed system of records and accounts than is required in small plants receiving their milk supply direct from the producers.

As it is not practicable to treat the subject exhaustively in a publication of this nature only the essential information required from each class of records will be described.

THE RECEIVING RECORDS.

The receiving records should show the quantity and value of the milk received, deductions from this amount for any reason, such as advances, and the amount actually paid to each producer, as well as the *total value and quantity of deliveries, deductions, and payments.*

When milk is brought to the plant it should be weighed at the receiving platform and each producer given a receipt for the quantity delivered. The duplicates of these receipts should be sent to the office and entered on milk pay-roll sheets. At the end of the payment period calculation should be made of the quantity delivered by the various producers. The unit price should then be entered and extension made of the gross amount due the various producers. From these amounts deductions should be made for advances or other purposes and the net amount of the check shown. When the day for payment arrives checks should be drawn for the various amounts and their numbers entered in a proper space on the milk pay-roll sheet. The total of these payments should be entered in the check register, the pay roll serving to show the detail necessary for proper reconcilement of the bank account.

PURCHASE RECORDS.

The purchase records should contain a complete history of every purchase (other than milk or cream) made by the organization. These purchase records should include a purchase requisition, a purchase voucher, a voucher register, and a voucher index.

Before any purchase is made a requisition should be issued and approved by the manager or other officer in charge of purchases in order that no unnecessary goods may be bought. This order should be issued in duplicate, the original mailed to the supply firm and the duplicate placed in an unfilled order file until the goods are received. When the invoice is received the duplicate purchase requisition should be removed from the file, attached to the invoice, and returned to the file. When the goods are received the invoice should be taken from the file, checked with the goods and with the duplicate of the purchase requisition, and entered in a purchase voucher. It is often helpful to have a record on the duplicate purchase requisition of the quantity on hand, monthly consumption, and last quotation. A purchase voucher, which forms a filing jacket in which the requisition and invoices are placed for filing, should be filled out and the invoice noted thereon; it is then assigned a number and filed until the end of the month. But one voucher is made for a single concern for any given month; hence a purchase voucher may contain several invoices. Vouchers should be filed in numerical order.

In order that any invoice may be easily located an alphabetical index should be kept on 3 by 5 cards. This index should contain a card for each company from whom purchases have been made at any time. All numbers assigned to purchase vouchers of an individual concern should appear chronologically on the index card showing the company's name.

At the end of the month all purchase vouchers for the month should be taken from file and completed by entering in the space provided the total amount of invoices included in such voucher, and the allocations to the proper ledger account should be made. The vouchers then should be entered consecutively in the voucher register to the credit accounts payable, charges being made as indicated on the voucher, after which these should be filed in numerical order according to the number previously assigned.

The voucher register contains a record of the purchase vouchers. It should be provided with a number of columns, so that items of frequent occurrence may be collected, thus decreasing the amount of work required in posting.

A memorandum column should be provided on the left-hand side for entering the number and amount of checks given in payment as vouchers. No detail accounts payable need be kept, as the voucher and voucher record afford a convenient record of all such items.

DRIVER'S RECORDS.

The product taken out by a driver should be checked out to him on a load sheet by the checker. This load sheet should be retained by the checker until the driver returns, the returned goods and empty containers should be noted thereon, and the net sales determined.

The driver should then fill out a sales report showing the quantity and value of each item sold, the amount of cash and tickets collected, the detail of all other transactions, and should present it, together with his copy of the load sheet, to the cashier as a basis for his daily settlement. In making this settlement the cashier must check the load requisition sheet with the sales report as to quantity of sales, the sales report with the cash turned in as to cash sales and collections, and collect the proper amount from the driver.[1]

The ticket sales should be handled in the same manner as other sales by providing a place for "tickets out" and "tickets in" on the driver's load sheet and for "tickets sold" and "tickets collected" on the driver's sales report. The driver's sales report, after being checked, is passed to the bookkeeper for entry in the sales book. The counter clerk and special delivery driver should be required to make out a daily requisition and sales report.

THE SALES RECORD.

The sales record should furnish a complete detailed analysis of all sales.

A sales sheet should be made out for each salesman and the sales as shown on the sales report entered on this sheet. At the end of the period all sales sheets should be footed and balanced and the several footings recapitulated, giving the total sales for the period. The retail and wholesale sales should be kept separate.

RECEIPTS AND DISBURSEMENTS.

All money should be received by the cashier, who should issue a receipt for each payment, retaining a duplicate in the office. The cash-receipts book is a register of all cash received and must be written up from the duplicates of the cashier's receipts. All money received should be deposited in the bank daily. The cash-receipts book should be so arranged that the receipts can be shown to agree with the bank deposit.

All disbursements should be made by check, which should be entered in the check register. The manager should give the necessary instruction when any payment is to be made. Checks should

[1] This refers solely to a cash system of sales. In case a credit system is in use, additional safeguards should be established to insure proper accounting for all sales and collections.

be registered when issued and the totals of the check register will be the total disbursements for the period.

ACCOUNTS RECEIVABLE RECORD.

Where a credit business is conducted an abnormally high percentage of loss from bad accounts is frequently experienced. It often happens that a company has credit customers whose names do not appear on the route book, the number of the house being the only record. In allowing credit the driver should never fail to take the customer's name in order that he may be traced in case of moving from one address to another, and his credit standing in the community may be ascertained. Many losses occur through the failure of drivers to follow up collection programs and a neglect of the company to check outstanding accounts properly.

One of the most important features of an accounting system for milk plants is the method used in controlling route charges and collections. Great care should be exercised in checking the receipts on account and the charges shown on the driver's route book and in keeping the amount shown in agreement with the controlling account. Sound business practice demands that milk accounts should not be allowed to stand on the books uncollected for a period of more than 30 days.

PAY ROLL.

A time book or pay roll should be kept at all times, showing for each employee the time worked, rate of pay, and amount due. At the end of the month the total amount due for wages and salary should be charged to the proper expense account and credited to the pay-roll account, whether or not these amounts have been paid.

Checks given in payment for labor or salary and advance payments on them should be charged to the pay-roll account. By following this method expense accounts will always show correct charges regardless of the time of payment, and any credit found in the pay-roll account at the end of the month will represent an accrued liability on account of unpaid wages and salary.

STOREROOM.

Too much emphasis can not be placed on the matter of handling supplies and equipment purchased by a company for sale or for future use. This property should be safeguarded no less carefully than should cash. Frequently this is not done, and the loss occurring through this neglect is a serious factor in the failure which often follows. Therefore, a very thorough system of accounting for supplies placed in and withdrawn from the storeroom should be kept.

All supplies purchased for future use should be kept in the storeroom and charged to the storeroom account. These supplies should be recorded on an inventory sheet. As supplies are required for use a storeroom requisition should be made by the employee needing these supplies, such requisition showing the quantity, size, and other information necessary to identify the supplies desired. The requisition must be approved by the factory foreman or manager and presented to the storeroom keeper, who will deliver the material to the employee. The storekeeper should then fill in the price and at intervals record the requisitions on the inventory sheet. At the end of the month the value of the material withdrawn from the storeroom is credited to storeroom accounts and charged to the various accounts affected by the use of this material.

THE JOURNAL.

All the information recorded in the records heretofore described is classified monthly and made ready for posting into the general ledger in a book called the journal. This book is all-important, and is a connecting link between the original record and the ledger from which all information is secured to compile financial and operating reports. All general ledger posting must be made from this book (the journal) and from no other records.[2]

THE GENERAL LEDGER.

The ledger is the book of accounts. After the transactions of the business have been recorded in the journal, the debit and credit items arising from such transactions are posted (or transferred) to the proper accounts in the ledger. In this manner all the facts concerning the particular subject are collected under its name and can be viewed as a whole.

Any system of accounting, to be of maximum value to those who control the business, must have a very carefully planned and clearly defined classification of ledger accounts, and the person charged with keeping these accounts must adhere rigorously to this classification.

THE STATISTICAL REPORTS.

Inasmuch as the entire bookkeeping is carried on for the purpose of accumulating and presenting information concerning the operation of the business, too much care and attention can not be given to the preparation of statistical reports, chief among which are the income and expense statements, and the balance sheets, and the cost sheets.

[2] In large and well-organized milk-distributing plants it is equally satisfactory to make postings direct from the original records; in the average milk plant, however, this is not advisable.

The income and expense statements should show in detail just which phases of the business are most profitable, the net profit or loss, and all the facts relative to the operation of the business for the period, as well as comparison with the previous period. The balance sheet should reflect the exact financial condition and should also show comparison with previous periods. The cost reports must show the unit cost (per quart) of every item of expense and the total cost per unit.

QUANTITY RECORDS.

Among the most important of all are the records of the quantity of milk handled through the various processes. Large volume (or quantity) is an important factor in a milk-distributing business, and for this reason unit costs must be closely watched. No manager can form a correct judgment of the efficiency of the operations unless he has the total quantity to compare with the total cost, and an accounting system arranged to show such information will be the best possible tool with which to ward off business failure.

It would be impossible to put too much emphasis on the importance of keeping adequate quantity records.

COST OF KEEPING ADEQUATE RECORDS.

A word of warning might be spoken regarding the operation of an accounting system. It is often looked upon as a necessary evil, the expense of which should be reduced in every way possible, and especially by such methods as the employment of low-salaried, incompetent bookkeepers, whose only recommendation is too often the small salaries for which their services may be secured. Unquestionably bookkeeping and all office expense should be kept as low as possible, but any reduction which tends to confuse and distort the information which a properly operated accounting system can furnish for the guidance of the management should not be considered for a moment. Without these important reports, those responsible for the direction of the affairs of the organization have no information on which to formulate the policies of management. Under these conditions proper guidance of the business is an impossibility.

A first-class bookkeeper will prove an exceedingly valuable asset; and after his work is done, to reap the best benefits possible from an adequate accounting system, nothing can take the place of a regular independent audit by a reputable firm of public accountants. The cost may seem excessive, but it will not be when compared with the benefits derived from it.

APPENDIX.

By-Laws of the ——— ——— Association.[1]

Article I.—*Name.*

Section 1. This association, incorporated under the laws of the State of ——— ———, shall be known as the (——— ——— Association).

Sec. 2. Its principal office shall be located in the town of ——— ———.

Article II.—*Objects.*

Section 1. The objects of this association shall be to encourage better and more economical methods of production, manufacture, and sale of milk, cream, butter, cheese, and other dairy products and dairy by-products and to engage in handling, grading, marketing, standardizing, manufacturing, storing, and advertising dairy products and dairy by-products.

Sec. 2. In order to carry out these objects the association shall have power—

(*a*) To purchase, rent, buy, build, or otherwise acquire and own, sell, lease, or control such buildings and equipment and real and personal property as may be needed for the convenient conduct of its operations.

(*b*) To borrow money and to secure the same by a mortgage, deed of trust, or other form of security upon any of its property, real or personal.

(*c*) To cooperate and affiliate, through membership or otherwise, with any other cooperative association formed for similar purposes in order to carry out the objects of this association.

Note.—Make the objects as definite as possible; but it is also well to make them sufficiently broad in scope to cover any future efforts of the association. Care should be taken to state the objects, so as to keep the activities within the limits of the power conferred by the statute under which the association is incorporated, as well as in harmony with the articles of association.

Article III.—*Membership.*[2]

Section 1. Any bona fide producer of dairy products in the territory served by this association may become a member of the association by agreeing to comply with the by-laws of this organization and purchasing at least (one) share of capital stock.

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[1] Adapted from Bulletin No. 541 of the U. S. Department of Agriculture entitled Cooperative Organization By-Laws. All matter appearing in parenthesis is suggestive merely and is to be altered to suit the best interest of each association. Those who desire to form an association which will come within the scope of the Capper-Volstead Act should remember that such an association (*a*) must be composed entirely of producers; (*b*) must not deal in the products of nonmembers to an amount greater in value than such as are handled by it for members; and (*c*) must comply with one or both of the following requirements: (1) That no member of the association is allowed more than one vote because of the amount of stock or membership capital he may own therein, or (2) that the association does not pay dividends on stock or membership capital in excess of 8 per centum per annum. Fuller information concerning the Capper-Volstead Act may be obtained from the Bureau of Agricultural Economics, United States Department of Agriculture.

[2] The following is applicable to capital-stock organization. On p. 43 suitable sections for nonstock organizations are suggested.

ARTICLE IV.—*Fiscal Year—Meetings.*

SECTION 1. The fiscal year of the association shall commence (January 1) and end on (the 31st of the following December).

SEC. 2. The annual meeting of the association shall be held in the town of (———————) on the (third Monday in January) of each year, at (10 o'clock a. m.)

NOTE.—The annual meeting should be held as soon after the end of the fiscal year as will allow for the settlement of all accounts, auditing of the books, and the preparation of the annual reports of the officers.

SEC. 3. Special meetings may be called at any time by the president. He shall call such meetings whenever (10 per cent) of the members shall so request in writing.

SEC. 4. Notice of the annual meeting shall be mailed by the secretary to each member at least 10 days previous to the date of the meeting and such notice shall be published in a local newspaper not less than (10 days) previous to the date of the meeting. At least (10 days) before the date of any special meeting the secretary shall mail notice of such meeting to each member, which shall state the nature of the business to be transacted at such meeting.

ARTICLE V.—*Quorum.*

SECTION 1. (One-fourth) of the members in good standing shall constitute a quorum for the transaction of business at any meeting.

NOTE.—When the organization is small and compact, the proportion required for a quorum may be larger than in a large organization which includes considerable territory.

ARTICLE VI.—*Directors and Officers.*

SECTION 1. The board of directors of this association shall consist of (seven) members. After the adoption of these by-laws, the members shall elect from among themselves (seven) directors, who shall hold office for the period of one year or until their successors shall have been elected and qualified and shall enter upon the discharge of their duties.

NOTE.—In some States the corporation laws stipulate the number of directors and officers an association shall have. The plan of having each district represented on the board of directors tends to avoid jealousies between the various districts, but a small board of capable men is to be preferred to a large board composed largely of members who can not give proper attention or time to their duties on the board. In case it should be the wish of the members to recall a director this can be effected under section 6 of this article.

SEC. 2. The board of directors shall meet within (10) days after the first election and after each annual election, and shall select by ballot a president and a vice president from among themselves, and a secretary treasurer (or a secretary and a treasurer) who may or may not be a member of the association. The officers shall hold office for one year or until their successors are duly elected and qualified.

NOTE.—In some organizations it is desirable to have some one outside the membership act as secretary or treasurer. When such is desired proper provision for it should be made in the by-laws. In some cases, especially when the board of directors is large, it is desirable to have an executive committee. Such a committee may consist of the officers and one or more members of the board of directors.

SEC. 3. Any vacancy in the board of directors shall be filled for the unexpired term at a special meeting called for the purpose.

SEC. 4. (Four) members of the board of directors shall constitute a quorum at any meeting of the board.

SEC. 5. (The compensation, if any, of the board of directors and the officers shall be determined by the members of the association at a regular or called meeting of the association.)

SEC. 6. Any director or officer of the association may be removed from office at any annual or special meeting by a two-thirds vote of the members present following the mailing of a notice to each member in accordance with these by-laws specifying that the matter of the removal of such director or officer is to be voted upon at such meeting. Such director or officer shall be informed in writing of the charges against him at least (10) days before such meeting, and at such meeting shall have an opportunity to be heard in person, by counsel, and by witnesses.

ARTICLE VII.—*Duties of the Directors.*

SECTION 1. The board of directors shall be responsible for the proper conduct of the business affairs of the association and shall make any necessary rules and regulations, not inconsistent with law or with these by-laws, for the management of the business and the guidance of the officers, employees, and agents of the association.

SEC. 2. The board of directors shall have the power to establish rules and regulations regarding the inspection and grading of the products handled by the association.

SEC. 3. All brands, labels, trade-marks, and the like, established by the association, shall be registered and become its property, and they shall be attached only to such grades as shall be designated by the board of directors.[3]

SEC. 4. The board of directors may employ a business manager, fix his compensation, and dismiss him for cause. He shall conduct the business of the association in accordance with a policy agreed upon and approved by the board of directors.

SEC. 5. The board of directors shall require the treasurer and all other officers, agents, and employees responsible for the custody of its funds or property to give bond with sufficient surety for the faithful performance of their official duties, the cost of which shall be paid by the association.

SEC. 6. The board of directors shall meet on the (first Saturday) of each month at the office of the association in the town of (——— ———). Special meetings of the board shall be held upon call of the president or upon written request of (three) members of the board.

ARTICLE VIII.—*Duties of the Officers.*

SECTION 1. The president shall—

(*a*) Preside over all meetings of the association and of the board of directors.

(*b*) Sign as president, with the (secretary-treasurer) all checks, notes, deeds, and other instruments on behalf of the association.

(*c*) Call special meetings of the association and of the board of directors and perform all acts and duties usually required of an executive and presiding officer.

SEC. 2. In the absence or disability of the president, the vice president shall perform the duties of the president.

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[3] The rules for grading and inspection will necessarily depend on the organization and the kind of business engaged in and this should be kept in mind when drawing up the by-laws.

SEC. 3. The (secretary-treasurer) shall—

(*a*) Keep a complete record of all meetings of the association and of the board of directors.

(*b*) Sign as (secretary-treasurer), with the president, all checks, notes, deeds, and other instruments on behalf of the association, previously approved by the business manager.

(*c*) Serve all notices required by law and by these by-laws.

(*d*) Receive and disburse all funds and be the custodian of all property of this association.

(*e*) Keep a complete record of all business of the association and make a full report of all matters and business pertaining to his office to the board of directors monthly and to the members at their annual meeting and make all reports required by law.

(*f*) Perform such other duties as may be required of him by the business manager, the board of directors, and the association.

NOTE.—When the offices of secretary and treasurer are separate the duties of each should be given in different sections.

ARTICLE IX.—*Duties and Powers of the Business Manager.*

SECTION 1. Under the direction of the board of directors, the business manager shall employ and discharge all employees, agents, and laborers. He shall generally supervise the production, handling, manufacture, and marketing of the dairy products and dairy by-products of the association, to the end that the business of the association may be conducted in the most economical and efficient manner.

NOTE.—The manager occupies a highly important position and his power must be limited as little as possible. The success or failure of the association rests to a large degree with him. He can not be held responsible if he is to be dictated to at will by each member or if the officers are to meddle constantly with his work. This does not mean that the manager should not be subject to the orders of the board of directors. He should take suggestions from the officers and members and from them and his own experience formulate a business plan. Whenever a manager loses the confidence of the members he should be replaced.

ARTICLE X.—*Capital Stock.*[4]

SEC. 1. The capital stock of this association shall be ——— dollars, divided into ——— shares of ——— dollars each.

SEC. 2. Each member shall subscribe for one share of capital stock for each ——— of ——— to be delivered by him to the association. Such shares shall be paid for in cash, or deductions may be made and applied to the payment of the shares from amounts due him by the association for products delivered and sold by it. The amount of such deductions shall be fixed by the board of directors. Shares shall not be issued until paid for in full.

SEC. 3. Whenever any stockholder desires to sell his stock he shall first offer it to the association for purchase by it or by a person or persons designated by the board of directors of the association at a price to be conclusively determined by the board of directors. In the event the stock is not purchased by the association or by a person or persons designated as aforesaid, within 30 days after the receipt of a written notice by the association offering the stock for sale, then the stockholder may sell the stock to any person engaged in the production of dairy products. This restriction on the transfer of stock shall be printed on every certificate of stock.

[4] These sections are applicable to capital-stock organizations. On p. 43 suitable sections for nonstock organizations are suggested.

SEC. 4. If any member shall by purchase or by operation of law come into possession of more than ——— shares of the capital stock of this association, the board of directors may elect to purchase, and such member shall then sell to the association, such excess shares at a price to be conclusively determined by the board of directors, plus any dividends or refunds due and unpaid. Also, in the event of the death or disability of the owner of any shares of stock in this association, such shares of stock may be purchased by the association and shall, in the event the board of directors elects to purchase them, be sold by such owner or his legal representatives to the association at a price to be conclusively determined by the board of directors, plus any dividends or refunds due and unpaid.

NOTE.—The legal effect of sections 2, 3, and 4, above, depend entirely upon the charter provisions and the laws of the State in which the association is incorporated. They are suggested here as possible means of safeguarding cooperative principles, and are to be incorporated into or excluded from the by-laws upon the advice of competent legal counsel. Printing these restrictions upon the body of the stock certificate is a convenient and effective method of giving notice of such restrictions to intending purchasers.

If the organization desires to have both common and preferred stock, proper provision for such should be made in this article.

ARTICLE XI.—*Contracts and Agreements.*

SECTION 1. Every producer delivering milk or dairy products to this association shall enter into a contract with the association in the form required by the board of directors, containing, among others, the following provisions:

(*a*) That the member, by said contract, appoints the (——— ——— Association) his sales agent to sell all dairy products and dairy by-products produced by him for sale or such part thereof as shall be specified in the contract, and binds himself to deliver such products to the (——— ——— Association) for sale at such time and place as the association directs.

(*b*) That said contract shall run continuously unless canceled by the member on the ——— of any year by surrendering his contract and giving written notice to the association at least 30 days prior to said date of his desire to cancel the contract. Such cancellation shall be subject to any indebtedness due from the member to the association.

NOTE.—No cooperative association should attempt to do business without first having made a definite contract with each producer. Such contracts tend to give stability and permanence to the organization and enable the manger to plan more definitely for the handling and sale of the products received.

ARTICLE XII.—*Duties and Rights of Members.*

SECTION 1. A member shall have the right to give away or retain for his use in his household or on his farm such of his dairy products as he may wish, but he shall not sell any products contracted to the association to an outside party, except products offered to and rejected by the association.

SEC. 2. In case any member is offered a price in excess of the price obtainable by the association, said member shall refer said bid to the association.

SEC. 3. On or before ——— day of ——— of each year each milk producer shall report to the association the number of cows which he has in his herd and the approximate amount of dairy products which he expects to market monthly through the association during the ensuing year.

SEC. 4. Each stockholder of the association shall have only one vote. Voting by proxy shall not be permitted. Members may vote by mail on specific ques-

tions in those instances where authorized to do so by the board of directors. In such cases the secretary shall mail notices of such specific questions to each member (10) days before the date of the meeting. Members voting by mail on specific questions shall transmit their ballots to the secretary of the association by registered mail and such ballots shall be counted only in the meeting at the time at which such vote is taken.

NOTE.—In a stock company, organized to earn profits on the money invested in the business, voting rights are granted to the stockholders in proportion to the number of shares held. In a cooperative association where the individual members have common interests, equality is obtained by limiting each member to one vote. The practice of allowing members to collect the proxies of absent members and vote the same tends to give such members undue influence in the affairs of the association.

SEC. 5. Any member having a grievance or complaint against the association may appeal to the board of directors, or to the members, at any regular or called meeting.

ARTICLE XIII.—*Expenses and Payments.*

SECTION 1. The expenses of operating and maintaining this association shall be met by a percentage deduction from the returns for products sold, the amount of such percentage to be fixed by the board of directors.

SEC. 2. The returns from the sale of all products of the same grade shall be pooled and final payments made to producers on the basis of the average price received during such periods as the board of directors from time to time may determine. Advance or partial payments for such products shall be made to the producers as the board of directors may determine.

ARTICLE XIV.—*Refunds and Damages.*[5]

SECTION 1. After payment to the producers of a specified portion of the amount received for their product, and after the season's expenses are paid and a suitable sum, to be determined by the board of directors, set aside for depreciation and reserves, the balance shall be divided as follows:

(*a*) The stockholders shall receive not to exceed (6) per cent per annum on the par value of their stock.

(*b*) The remainder, if any, shall be divided among the patrons of the association in proportion to the value of the products handled for all such patrons whether members or nonmembers.

SEC. 2. Any member who fails to live up to his agreement or fails or refuses to deliver his products to the association for sale in accordance with said agreement shall pay to the association as liquidated damages the sum of ——— for each ——— of ——— not delivered by him to compensate the association for the loss sustained by the breach, and to enable it to meet and equitably distribute overhead and maintenance expenses involved in the operation of the association and in providing and maintaining facilities for the handling and marketing of the products of its members; said sum may be deducted from any money due the member in the possession of the association.

ARTICLE XV.—*Accounts and Auditing.*

SECTION 1. This association shall install a standard system of accounts, and provide such accounting appurtenances as may be necessary to conduct the business in a safe and orderly manner.

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[5] These sections are applicable to capital-stock organizations. On p. 43 suitable sections for nonstock organizations are suggested.

SEC. 2. The books and records of the business of the association shall be audited (monthly) by a competent auditor selected by the board of directors. A complete annual audit shall be made by a competent accountant previous to the date of each annual meeting, at which meeting the report of the auditor shall be presented in full. Special audits shall be made upon order of the board of directors or upon a majority vote of the members present at any regular or called meeting.

ARTICLE XVI.—*Amendments.*

SECTION. 1. These by-laws may be amended at any meeting by two-thirds vote of the members present in person or voting by registered mail, provided that notice of such proposed amendment is included in the call for said meeting.

BY-LAWS FOR NONSTOCK ORGANIZATIONS.

While most of the cooperative milk plant organizations have been formed with capital stock, the nonstock plan has been adopted in some instances. The following articles are suggested for substitution for the corresponding articles in the preceding by-laws in adapting them to organizations formed without capital stock.

ARTICLE III—*Membership.*

SECTION 1. Any bona fide producer of dairy products in the territory served by this association may become a member of the association by agreeing to comply with the requirements of these by-laws.

SEC. 2. Upon the payment of the membership fee, the association shall issue a certificate of membership to the applicant. Such certificate of membership shall not be transferable. The willful violation of the by-laws of this association or of the contract or contracts entered into by the association with any member shall constitute a sufficient cause for expulsion of such member.

SEC. 3. No member shall be expelled from the association except by a two-thirds vote of the members present at any annual or special meeting following the mailing of a notice to each member in accordance with these by-laws, specifying that the matter of the expulsion of such member is to be voted on at the meeting. The member shall have charges preferred against him 10 days in advance of such meeting and shall have an opportunity to be heard in person, by counsel, and by witnesses. After a hearing, if the board of directors determines that a member has ceased to be a bona fide producer of dairy products, his membership shall be terminated and his membership certificate canceled.

ARTICLE X.—*Membership Fees and Finance.*

SECTION 1. Each member shall pay in advance to the association a membership fee of ($———).

SEC. 2. Certificate of indebtedness which shall draw interest at the rate of (6) per cent per annum, may be issued by the board of directors to provide capital to be used for the purchase or construction of buildings, the lease or purchase of lands, the purchase of equipment, and for other purposes.

SEC. 3. These certificates shall be issued in series and shall be retired by a special fund created by levying a percentage assessment, to be determined by the board of directors, on the products sold through the association. This amount shall be sufficient to retire all certificates as they fall due and pay the interest thereon.

SEC. 4. At the end of each fiscal year each member shall receive a certificate for the amount of money which he has contributed that year to the special loan fund levied on his products. These assessments shall continue from year to year, and out of the proceeds arising therefrom the holders of certificates shall be paid the amounts due them, and this process of repayment shall continue during the life of the association.

ARTICLE XIV.—*Refunds and Damages.*

SECTION 1. After the season's expenses are paid and a suitable sum, to be determined by the board of directors, set aside for depreciation and reserves, the balance of the season's returns of savings on products shall be divided among members and nonmember patrons, if any, in proportion to the value of their products sold or handled by the association for them.

SEC. 2. Any member who fails to live up to his agreement, or fails or refuses to deliver his products to the association for sale in accordance with said agreement shall pay to the association as liquidated damages the sum of ——— for each ——— of ——— not delivered by him to compensate the association for the loss sustained by the breach and to enable it to meet and equitably distribute overhead and maintenance expenses involved in the operation of the association and in providing and maintaining facilities for the handling and marketing of the products of its members; said sum may be deducted from any money due the member in the possession of the association.

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